APPENDIX C

(CLEAN VERSION OF ALL PENDING CLAIMS)

(Serial No. 09/888,890)

CLAIMS

What is claimed is:

1.   A method for preparing a digital object to be rendered, comprising:
sorting data representative of at least three vertices of at least one polygon of at least a portion
        the digital object;
generating an orientation decision variable based on relative positions of said at least three
        vertices; and
calculating a cross product term of said at least one polygon following said sorting.

2.   The method of claim 1, further comprising determining a sign of said a cross
product term.

3.   The method of claim 2, further comprising evaluating said sign of said cross
product term and said orientation decision variable to determine whether to cull said data prior to
rendering an image of at least a portion of the digital object.

4.   The method of claim 3, wherein said evaluating comprises comparing said sign of
said cross product term, as modified with said orientation decision variable, and an actual
orientation of said at least one polygon.

5.   The method of claim 1, further comprising using at least one of said cross product
term and a positional difference between two of said at least three vertices to determine an
appearance characteristic of said at least one polygon.

6.   The method of claim 1, wherein said sorting and said generating are effected
substantially concurrently.

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7.   The method of claim 1, wherein said generating comprises generating said orientation decision variable based upon a sorted order of said data representative of said at least three vertices.

8.   (Amended) The method of claim 7, wherein said generating further comprises generating said orientation decision variable to indicate that an orientation of said at least one polygon is one of an orientation of said at least one polygon, as indicated by a sign of said cross product term, and opposite an orientation of said at least one polygon, as indicated by said sign of said cross product term.

9.   A method for preparing a digital object to be rendered, comprising:
sorting data representative of at least three vertices of at least one polygon of the digital object;
generating an orientation decision variable based on relative positions of said at least three vertices; and
calculating a cross product term of said at least one polygon following said sorting.

10.   The method of claim 9, further comprising determining a sign of said cross product term.

11.   The method of claim 10, further comprising evaluating said sign of said cross product term and said orientation decision variable to determine whether to cull said data prior to rendering an image of the digital object.

12.   The method of claim 11, wherein said evaluating comprises comparing said sign of said cross product term, as modified with said orientation decision variable, and an actual orientation of said at least one polygon.

13. The method of claim 9, further comprising using at least one of said cross product term and a positional difference between two of said at least three vertices to determine an appearance characteristic of said at least one polygon.

14. The method of claim 9, wherein said sorting and said generating are effected substantially concurrently.

15. The method of claim 9, wherein said generating comprises generating said orientation decision variable based upon a sorted order of said data representative of said at least three vertices.

16. (Amended) The method of claim 15, wherein said generating further comprises generating said orientation decision variable to indicate that an orientation of said at least one polygon is one of an orientation of said at least one polygon, as indicated by a sign of said cross product term, and opposite an orientation of said at least one polygon, as indicated by said sign of said cross product term.

17. A system for rendering an image of a digital object, comprising:
a first logic circuit that sorts data representative of at least three vertices of at least one polygon
    of at least a portion of the digital object;
a second logic circuit that generates an orientation decision variable based on relative positions of
    said at least three vertices; and
a third logic circuit that calculates a cross product term of said at least three vertices following
    sorting thereof by said first logic circuit.

18. The system of claim 17, wherein said first, second, and third logic circuits are each under control of a back face culling application.

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19. The system of claim 17, wherein said first, second, and third logic circuits are each part of a computer processor.

20. The system of claim 17, further comprising a fourth logic circuit that determines a sign of said cross product term.

21. (Amended) The system of claim 20, further comprising a fifth logic circuit that determines an orientation of said at least one polygon based on said sign of said cross product term and said orientation decision variable.

22. (Amended) The system of claim 21, wherein said fifth logic circuit also decides whether to cull said data representative of said at least three vertices based on said orientation of said at least one polygon.

23. The system of claim 17, wherein at least one of said orientation decision variable and a positional difference between two of at least three sorted vertices is useful for imparting a characteristic to said at least one polygon.

24. The system of claim 17, wherein said first and second logic circuits operate substantially concurrently.

25. The system of claim 17, wherein said first and second logic circuits comprise the same logic circuit.

26. A system for rendering an image of a digital object, comprising:
a first logic circuit that sorts data representative of at least three vertices of at least one polygon
    of the digital object;
a second logic circuit that generates an orientation decision variable based on relative positions of
    said at least three vertices; and

a third logic circuit that calculates a cross product term of said at least three vertices following sorting thereof by said first logic circuit.

27. The system of claim 26, wherein said first, second, and third logic circuits are each under control of a back face culling application.

28. The system of claim 26, wherein said first, second, and third logic circuits are each part of a computer processor.

29. The system of claim 26, further comprising a fourth logic circuit that determines a sign of said cross product term.

30. The system of claim 29, further comprising a fifth logic circuit that determines an orientation of said at least one polygon based on said sign of said cross product term and said orientation decision variable.

31. (Amended) The system of claim 30, wherein said fifth logic circuit also decides whether to cull said data representative of said at least three vertices based on said orientation of said at least one polygon.

32. The system of claim 26, wherein at least one of said orientation decision variable and a positional difference between two of at least three sorted vertices is useful for imparting a characteristic to said at least one polygon.

33. The system of claim 26, wherein said first and second logic circuits operate substantially concurrently.

34. The system of claim 26, wherein said first and second logic circuits comprise the same logic circuit.

35.   A method for processing a digital image including a plurality of polygons, each polygon of the plurality including at least three vertices, said method comprising:

sorting data representative of the at least three vertices for each polygon;

determining positional differences between adjacent vertices of each polygon following said sorting;

determining a cross product term for each polygon from said positional differences;

evaluating said cross product term for each polygon and a sorted order of said data to determine an orientation of each polygon; and

culling data representative of polygons oriented in a back facing direction.

36.   The method of claim 35, further comprising using at least one of said positional differences in another rendering operation.

37.   The method of claim 35, further comprising determining a sign of said cross product term.

38.   (Amended) The method of claim 37, further comprising evaluating said sign of said cross product term based on said sorted order of said data.

39.   The method of claim 38, wherein said evaluating comprises changing said sign.

40.   The method of claim 38, wherein said evaluating comprises leaving said sign unchanged.

41.   (Amended) The method of claim 37, wherein said culling includes comparing said sign to an actual orientation of each polygon to determine whether said orientation has changed.

42.   The method of claim 35, wherein said sorting comprises sorting said data based on relative positions of the at least three vertices of each polygon.

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43. (Amended) The method of claim 42, wherein said sorting comprises sorting said data based on relative vertical positions of the at least three vertices of each polygon.

44. (Amended) The method of claim 43, further comprising sorting said data based on relative horizontal positions of at least two vertices of the at least three vertices of each polygon.

45. (Amended) The method of claim 35, further comprising generating an orientation decision variable.

46. The method of claim 45, wherein said generating is effected substantially simultaneously with said sorting.

47. The method of claim 45, wherein said generating is effected following said sorting.

48. The method of claim 45, wherein said evaluating said sorted order of said data comprises evaluating said orientation decision variable.

49. (Amended) A method for rendering an image of a digital object, comprising:
sorting data representative of positions of at least three vertices of a polygon of the digital object;
determining a cross product term for said at least three vertices following said sorting;
determining whether said polygon is front facing or back facing based at least in part on an actual
    orientation of said at least three vertices, a sign of said cross product term, and a sorted
    order of said at least three vertices; and
culling data representative of positions of said at least three vertices if said polygon is back facing.

50. The method of claim 49, wherein said sorting is effected on a basis of relative positions of said at least three vertices.

51. The method of claim 50, wherein said sorting is based on relative vertical positions of said at least three vertices.

52. The method of claim 51, wherein said sorting is also based on relative horizontal positions of at least two vertices of said at least three vertices.

53. The method of claim 49, comprising determining an orientation decision variable based on a sorted order of said data.

54. The method of claim 53, wherein said determining said orientation decision variable is effected substantially concurrently with said sorting.

55. The method of claim 53, wherein said determining said orientation decision variable is effected following said sorting.

56. The method of claim 53, wherein said determining whether said polygon is front facing or back facing based at least in part on said sorted order of said at least three vertices comprises considering said orientation decision variable.

57. (Amended) The method of claim 49, wherein said determining whether said polygon is front facing or back facing comprises determining whether said at least three vertices are oriented in a clockwise direction or a counterclockwise direction.

58. The method of claim 56, wherein said determining whether said polygon is front facing or back facing comprises comparing an orientation in which said at least three vertices are arranged to an actual orientation of said at least three vertices on a surface of said polygon.

59.   (Amended) A method for rendering an image of a digital object that includes a plurality of polygons, each of said polygons having at least three vertices, said method comprising:

sorting data representative of the at least three vertices of each polygon of the plurality of polygons of the image;

determining an orientation of the at least three vertices based on a sorted order of said data;

determining whether said orientation of the at least three vertices of each polygon of the plurality of polygons has changed from an actual orientation of the at least three vertices of each polygon of the plurality of polygons; and

culling data of the at least three vertices of each polygon of the plurality of polygons when said orientation has changed from said actual orientation.

60.   (Amended) The method of claim 59, wherein said determining said orientation comprises determining whether said actual orientation of the at least three vertices of each polygon of the plurality of polygons is clockwise or counterclockwise.

61.   (Amended) The method of claim 60, wherein said determining whether said orientation of the at least three vertices of each polygon of the plurality of polygons has changed comprises determining whether said orientation is opposite said actual orientation.

62.   (Amended) The method of claim 61, wherein said sorting comprises arranging data representative of positions of the at least three vertices of each polygon of the plurality of polygons based on at least relative vertical positions of the at least three vertices of each polygon of the plurality of polygons.

63.   The method of claim 62, wherein said sorting further comprises arranging said data based on horizontal positions of at least two vertices of the at least three vertices.

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64. The method of claim 59, comprising generating an orientation decision variable based on said orientation.

65. The method of claim 64, further comprising calculating a cross product term for each polygon based on sorted data.

66. The method of claim 65, further comprising determining a sign of said cross product term.

67. (Amended) The method of claim 66, wherein said determining whether said orientation of the at least three vertices of each polygon of the plurality of polygons has changed comprises evaluating said sign of said cross product term and said orientation decision variable.

68. (Amended) The method of claim 59, further comprising providing each polygon with an appearance based at least in part on at least one of a cross product term of that polygon and a positional difference between at least two vertices of the at least three vertices of that polygon.